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The Role of Social Distrust in Risk-Benefit Analysis: A Study of the Siting of a Hazardous Waste Disposal Facility

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ABSTRACT

Distrust of social institutions is becoming an important component of risk communication and policy analysis. To assess the impact of social distrust on decision making, we examine the role of distrust of information sources on the willingness to accept a hazardous waste disposal facility in one's neighborhood. Using a prospective reference utility model, distrust of information sources is analyzed a possible influence on individual choice in a risk-benefit tradeoff. Using contingent valuation survey data on the siting of a hazardous waste disposal facility, we find that respondents are particularly distrustful of both governmental officials and waste disposal businesses. We find that social distrust increases the perceived risk of a facility and influences the likelihood of accepting a referendum to site a hazardous waste disposal facility. The level of compensation offered in the contingent valuation scenario also is found to influence a respondent's risk perception.

Compensation is recognized as a potential component in the solution to the 'not-in-mybackyard' (NIMBY) impasse. The recognition of real costs borne by people who live near a noxious facility legitimizes the introduction of mechanisms and procedures that provide compensation (Kunreuther and Easterling 1996; O'Hare and Sanderson 1993; and Swallow, Opaluch and Weaver 1992). In a review of numerous studies regarding compensation and siting, Kunreuther and Easterling (1996) conclude that compensation may be a valuable tool in siting less noxious facilities, but appears to have little positive effect when siting facilities viewed as extremely risky. In many cases compensation is likely to elicit a negative response that has been characterized as a bribe when risk to personal healtli and the local environment are salient. Frey and Oberholzer-Gee (1996) and Frey, Oberholzer-Gee, and Eichenberger (1996) suggest that compensation, when considered a bribe, will crowd out any moral obligations to accept the facility and citizens may interpret the project as immoral or illegitimate. Such attitudes may lead to more violent protests and strategic behavior that results in society bearing greater costs for the siting than necessary.

The limits of compensation appear to closely defined by the concept of risk. Kunreuther and Easterling (1990) find that individuals are more concerned with the ability to measvire the hazards ofa facility than with any level of compensation. Inhaber (1992) suggests that compensation may be present in a siting debate but it is a secondary, sufficient condition while risk communication and control is the dominant, necessary condition. Kasperson, Golding and Tuler (1992) argue that compensation cannot substitute for safety assurances. They further argue that offering compensation for risk (rather than attempts at reducing risk) increases social distrust thus making compensation unacceptable. Frey and Oberholzer-Gee (1996) speculate that offers of compensation may be used as signals of risk by individuals causing increased compensation to lead to increases in an individual's perceived risk of the facility. Freudenburg and Pastor (1992) suggest that the public's overestimation ofthe risks of such facilities arises from a more fundamental distrust ofthe information sources, causing individuals to be prudent in their decision making processes.

The concept of social distrust has emerged as a particularly relevant issue when the element of risk to property and person is present. Frewer, Hedderley and Sheppard (1996) find that expertise in itself does not lead to trust but sources as seen to be characterized by positive attributes such as accountability and concem for the public welfare tend to be found more credible. Kunreuther and Slovic (1996) caution that technical analysis alone does little to reduce distrust but concems over process, power, participation, and decision making play a greater role. Prescriptive advice regarding the necessity to build trust has appeared in the literature. (Leiss 1996, O'Hare and Sanderson 1993).
Kasperson, et al. (1992) sees the loss of social trust as a broad fundamental societal phenomena and describes a process for risk communication that recognizes the role of prior information and the level of distrust towards the participants. Drawing on the concepts of (a) self reports of being informed (about the waste facility issue) and (b) a summary judgment of distrust of the various actors in the siting drama, our study incorporates these two *a priori* elements into a risk-benefit model that includes an offer of compensation for accepting the facility. Using a prospective reference utility model in a risk-benefit trade-off scenario, we empirically analyze the role of distrust and prior information.

1. THE MODEL

As in previous analyses of hazardous waste policy and noxious siting decisions, we model the individual decisions in an expected utility framework, where the uncertainty arises

fi'om the adverse outcome from exposure to the facility (Kunreuther and Easterling 1990; Smith and Desvouseges 1986; and duVair and Loomis 1993). The adverse outcome in this case is treated as a reduction in health status. Therefore, we apply the WTA framework using a health state approach that is described in more detail in the formal model (Cook and Graham 1977; Viscusi and Evans 1990; Johannesson et al., 1993). Following Viscusi (1989), we frame the probability of adverse health outcome as a subjective measure of risk, where individuals update their risk beliefs by obtaining information and weighting their updates by the credibility of the information source.

Fonnally, suppose that households gain utility from health and income. Solution of the utility maximization problem yields the state dependent indirect utility function with price terms suppressed

$$U = v(H, y) \qquad (1)$$

where *U* is the reference utility level, *H* is exogenous health status, and *y* is income. If indirect utility is additively separable in health and income, let the utility associated with good health be:

$$v(H = 1, y) = h(1) + m(y) \qquad (2)$$

With poor health the utility level is:

$$V(H = 0, y) = h(0) + m(y) \qquad (3)$$

Suppose that without a hazardous waste landfill households face a probability of good health of 1. With a hazardous waste landfill the probability of good health is perceived to be *p*, where p** = {Ψp + Ψg}/(Ψ + ϕ), and Ψ is the weight given the individual's prior perceived probability of good health, *p,* and ϕ is the weight given the information sources reported probability of good health, *q* (Viscusi 1989). Then the expected indirect utility without the hazardous waste landfill is:

$$E(v_q) = m(y) + h(1) = m(y) + h(0) + [h(1) - h(0)] \qquad (4)$$

Expected indirect utility with the hazardous waste landfill is:

$$E(v_p) = m(y) + h(0) + p^*[h(1) - h(0)] \qquad (5)$$

The value of avoiding the hazardous waste landfill under uncertainty about health status is the minimum willingness to accept under uncertainty *{WTA):*

$$m(y) + [h(1) - h(0)] = m(y + WTA) + p^*[h(1) - h(0)] \qquad (6)$$

assuming that accepting the *WTA* amount allows the landfill to be sited which reduces the perceived probability of good health.

A referendum on siting the hazardous waste landfill presents to households the question: "Would you accept $A for good health with certainty, to *p** probability of good health?" which creates the problem:

$$m(y) + [h(1) - h(0)] \; (<) = (>) \; m(y + A) + p^*[h(1) - h(0)] \qquad (7)$$

li A > (<) WTA then the respondent will vote "yes" ("no") in the referendum from equation (7). Following subtraction and simplification:

$$Dv = m(y + A) - m(y) + (p^* - 1)[h(1) - h(0)] \quad (8)$$

where *Dv* is the change in the expected indirect utility function. The interpretation of this function is in two parts. The first, *m(y + A) – m(y),* is the increase in utility from the compensation offered to the neighborhood. The second, *(p** - l)[h(l) - h(0)] is the decrease in utility from the expected change in health status. The change in the expected indirect utility function has several important properties with the assumption of additive separabihty. With respect to income,

$$\partial Dv/\partial y = \partial m(y + A)/\partial y - m(y)/\partial y < 0 \quad (9)$$

if the marginal utility of income is diminishing with additional income.
As the weight given prior subjective probability of good health changes,

$$\partial Dv/\partial \Psi = -\{p - p^*\}/(\Psi + \phi)[h(1) - h(0)] < 0 \quad (10)$$

if the prior probability,/?, is less than/)* which occurs *if p* is greater than *q.* This indicates that as individuals increase the weight to prior risk assessment rather than new sources of information will see a decrease in utility due to the greater probability of poor health.
As the weight given new sources of risk assessment,

$$\partial Dv/\partial\phi = -\{q - p^*\}/(\Psi + \phi)[h(1) - h(0)] > 0 \quad (11)$$

which is positive when the reported probability, *q,* is greater than *p*,* which is the case when the reported probability of good health is greater than the perceived level of good health. As the perceived probability of good health changes,

$$\partial Dv/\partial p = \Psi/(\Psi + \phi)[h(1) - h(0)] > 0 \quad (12)$$

and

$$\partial Dv/\partial p = \Psi/(\Psi + \phi)[h(1) - h(0)] > 0 \quad (13)$$

both are positive because as the probability of good health increases ones utility increases. Lastly as the level of compensation changes,

$$\partial Dv/\partial A = \partial m(y + A)/\partial A > 0 \quad (14)$$

since the marginal utility of income is positive.

This prospective-reference utility model suggests that an individual's decision depends upon not only the amount of compensation offered but upon an individuals risk assessment and the weight given information provided by various sources. The weight respondents give to the various information sources is influenced by the level of distrust each source. In order to test the implications of the above model we perform a contingent valuation survey.

2. THE INSTRUMENT

Measures of prior information, distrust of information sources and perceived risk were obtained using a mail survey. This instrument was distributed to 900 head-of-households in Lawrence County, Pennsylvania in the spring of 1992. Lawrence County, located forty miles north of Pittsburgh has New Castle as its largest city, by virtue of its rural nature and proximity to major industrial centers, has been targeted several times prior to 1992 as a potential site for a hazardous waste disposal facility. The survey consisted of one primary mailing, a post card reminder, and one replacement instrument. The response rate was 41 percent.

Implementation of CV requires a description of the disamenity, a payment rule, a policy rule, and a question of behavioral intention. Information about the type of hazardous waste the landfill would accept, the amount of monitoring the state would provide, and a baseline of risk was provided in the survey. (See Appendix for full text of questions.) The behavioral intention question used was a dichotomous choice willingness-to-accept *{WTA)* question framed as follows:

> Suppose the State proposes to locate the hazardous waste landfill in your county. In return the State proposes to compensate people by reducing State income taxes by $A per family in your county per year. Would you be willing to accept this proposal?

In the survey the offer amount, $A, ranged from $100 to $2000. These amounts were chosen from a preliminary study using an open ended WTA question. Respondents were then given three alternatives: 'YES' 'NO' and 'DONT KNOW'. We follow the NOAA panel (Arrow et al. 1993) recommendation that don't know responses need to be included in CV analysis. The don't know responses are treated as "yes" responses to provide a conservative estimate of WTA following the recommendation of Mitchell and Carson (1989). Follow up questions were used to identify protest responses.

Prior to the CV scenario, the questionnaire asked for self reports of the level of prior information regarding the issues of siting a hazardous waste facility. This rather global item was measured with a five point Likert scale anchored by 'not at all informed' to 'very informed.' Ten agencies that often become principal players and/or information sources in the siting process were assessed as to the level of distrust held by the respondent. Distrust was measured on a five point Likert scale anchored by 'trust a lot' to 'trust none'. Individuals' risk perceptions were obtained by asking a perceived risk question that was stated "How likely do you feel a "problem" would arise at some future time (20-30 years) from a hazardous landfill?" The response used a Likert scale anchored by 1 NOT AT ALL LIKELY, 3 LIKELY to 5 VERY LIKELY. (See Appendix full text of questions).

3. THE DATA

Table 1 reports the means of the self-reports of prior information **(Informed),** perceived risk with respect to one's health **(Perceived Risk),** and distrust of the ten actors. The mean of Informed indicates that individuals feel informed about the siting issues while the mean of **Perceived Risk** suggests that respondents believe that a hazardous waste facility is likely to harm one's health when residing near it.

The highest levels of distrust are for waste disposal business, state government representatives,
and local county/township officials in that order. Media and governmental
agencies (EPA and state DER) were given moderate amounts of distrust. Low levels of distrust were for personal sources of information: families and friends and for environmental group spokespersons. College research reports were given the lowest level of
distrust of the ten actors. The level of distrust of the information from various sources may arise because the risk measures differ between professional affiliation (Lynn 1986). Individuals receiving different information from each source must decide upon the value of
the information given. Our results are consistent with Frewer, Hedderly and Shepherd (1996) who find government and business tend exhibit' the greatest amount of distrust. They attribute this distrust to the problem of vested interest, and the past record of the information source.

Table 1. Means of Informed, Risk and Distrust Perceptions (Standard deviation in parentheses)

Informed	2.92
	(1.27)
Perceived	3.80
Risk	(1.16)
College Research	2.42
Reports	(.94)
Environmental Group	2.68
Spokespersons	(1.08)
Reports from Family	2.88
and Friends	(1.03)
Department of Environmental	2.97
Resources (DER)	(1.19)
Environmental Protection	2.97
Agency (EPA)	(1.22)
Television and Radio	3.02
Reports	(.87)
News Paper Reports	3.05
	(.87)
Local County/Township	3.20
Officials	(.91)
State Governmental	3.51
Representatives	(1.04)
Waste Disposal	4.14
Business	(1.01)

Sample Size 288

The mean level of distrust among the various actors supports Kasperson et al.'s (1992) observance that a broad based loss of trust in leaders of social institutions may have occurred. One may extend their argument and suggest that even the media, the basis for an informed society, has suffered degradation of trust to the point that they may not be credible in such highly controversial issues such as the siting of a hazardous waste facility. The high trust rating given to environmental groups, and family and friends also signal a retreat from trusting impersonal agencies who are presumed to act in the best interests of the public. The high (relative) regard given to college research reports express source credibility likely attributed to an agency that has no material interest in the project and is reputed to be evenhanded in generating information.

4. DETERMINANTS OF DISTRUST

To determine if respondent's social distrust was particular to each actor or if a more generalized distrust of various institutions, a principal component analysis was performed (Hair, Anderson, and Tatham 1987). The factor analysis suggests that the distrust of the actors may be summarized into three broad categories that are labeled as **Government, News,** and **Authorities.** Table 2 illustrates the rotated factor structure (varimax procedure) and the emergent factors. The factor structure summarizes the individual informational sources fairly well. The first factor's, **Government,** strongest loadings were from the DER, the EPA, state govemment representatives, and local/township officials. The second factor. News, consisted of loadings from television and radio reports, news paper reports, and reports from family and friends. **Authorities,** the third factor, had the strongest loadings from college research reports, environmental group spokespersons and waste disposal businesses. Waste disposal business, however, loads with a negative value that indicates respondents who view environmental groups and college research reports as credible have the opposite opinion of waste disposal businesses.

Table 2. Rotated Factor Loadings of Trust Perceptions

	Factor 1 Government	Factor 2 News	Factor 3 Authorities	Communality
College Research Reports	.103	.144	**.748***	.59
Environmental Group Spokespersons	.232	.272.	**.721***	.65
Reports from Family and Friends	−.193	**.467***	.391	.41
Department of Environmental Resources (DER)	**.891***	−.026	.169	.82
Environmental Protection Agency (EPA)	**.876***	.020	.214	.81
Television and Radio Reports	.104	**.776***	.210	.69
Newspaper Reports	.119	**.876***	.125	.80
Local County/Township Officials	**.479***	.475	−.117	.47
State Governmental Representatives	**.733***	.818	−.113	.58
Waste Disposal Businesses	.378	.400	**−.508***	**.56**
Engin value	3.21	1.84	1.31	
Percent of Variance	32.1%	18.4%	13.1%	

Sample Size 228
*Indicates primary loading of trust of information source.

The perceived level of prior information about hazardous waste facilities, as well as demographics of income, age, number of children may have some predictive ability in estimating the level of distrust respondents report of the various actors. To explore these connections, we report six regressions: three using the emergent factor scores and three using the main actors. We identify the three main actors as the DER, waste disposal business and environmental spokespersons chosen because they play a most active role in the siting decision.

Table 3 reports the regressions with the summarized factor scores of distrust as the dependent variable. We find that those expressing a greater level of prior information and older individuals exhibit less distrust of the news media. We also find that individuals expressing a greater level of prior information show less distrust of authorities, while older respondents and respondents with higher incomes tend to be more distrustful of authorities. In Table 4, we report a second set of regressions using the raw scores on distrust of the most salient actors: the DER, waste disposal business, and environmental group spokespersons. Age is found to be a significant predictor of distrust in all three regressions. Older respondents are more distrustful of the DER and environmental groups and less distrustful of waste disposal businesses. Income is found to be a significant predictor of distrust of waste disposal business and environmental groups. Low income individuals are found to be more distrustful of waste disposal business and less distrustful of environmental groups than high income respondents. The level of prior information is found to be a significant predictor of only distrust in environmental groups. Respondents who report being well informed are less distrustful of environmental groups.

Table 3. Demographic Explanation Trust Perceptions: Factors (t-statistics in parentheses)

	Government	News	Authorities
Constant	−.216	.725**	−.765**
	(0.65)	(2.227)	(2.38)
Income	−.0006	.0022	.0073**
	(0.18)	(0.62)	(2.06)
Age	.0043	−.0067*	.0159**
	(0.96)	(1.85)	(3.62)
Children	0.65	−.021	.0008
	(0.86)	(0.32)	(0.02)
Informed	−.014	−.146**	−.099**
	(0.32)	(3.36)	(2.28)

Sample Size 288
*significance at .10 level
**significance at .05 level

Table 4. Demographic Explanation Trust Perceptions: Actors (t-statistics in parentheses)

	Waste Disposal Business	DER	Environmental Groups
Constant	4.89*	2.51**	2.10**
	(15.34)	(6.44)	(6.15)
Income	−.0095**	−.00094	.00783**
	(2.69)	(0.22)	(2.06)
Age	−.0096**	.0092*	.0134**
	(2.21)	(1.73)	(2.86)
Children	−.037	.070	−.077
	(0.52)	(0.82)	(1.01)
Informed	0.28	−.023	−.119**
	(0.682)	(0.44)	(2.57)

Sample Size 288
*significance at .10 level
**significance at .05 level

These results suggest that both young and low income individuals are highly distrustful of waste disposal businesses, while both young, low income individuals and individuals who report being well informed are highly trustful of information provided by environmental groups. Older respondents seem to express a somewhat greater trust of business.'
To further our understanding of the role of distrust, we explore how distrust influences the perceived risk of a hazardous waste facility.

5. DETERMINANTS OF PERCEIVED RISK

In Table 5, we report the results of two regression specifications on perceived health risks of a hazardous waste disposal facility. Our analysis indicates that social distrust, the level of the offer in the CV question and a respondent's income level all influence the perceived level of risk. Age and number of children did not, however, influence the perceived level of risk.

Table 5. OLS Risk Perceptions: Trust and Demographics (t-statistics in paretheses)

	Risk	Risk
Constant	4.5**	2.92**
	(10.57)	5.66)
Income	−.00009**	−.000006
	(2.18)	(1.39)
Age	.0020	.0014
	(0.38)	(0.28)
Children	.042	.027
	(0.49)	(0.35)
Prior	−.001	−.023
Information	(0.02)	(0.47)
Offer	−.0008**	−.0009**
	(2.37)	(2.55)
Offer Squared	.0000003**	.0000004**
	(2.34)	(2.43)
Government	.252**	—
	(3.96)	
News Media	.154**	—
	(2.28)	
Authorities	−.371**	—
	(5.64)	
Waste Disposal	—	.396**
Business		(6.02)
DER	—	.153**
		(2.47)
Environmental Group	—	−.263**
Spokesman		(4.17)

Sample Size 288: * significance at .10 level, **significance at .05 level

In both specifications, we find that as income rises, individuals perceive hazardous waste facilities as less of a health risk. This result is consistent with Bonjean and Grimes (1974) who argue that respondents with higher income believe they have more control over life decisions.^ In addition, we find that self reports of being informed do not influence risk perceptions. This find supports conclusions by Kunreuther and Slovic (1996) and Leiss (1996) that information is less valued than trust in actors in the siting dilemma.

We do, however, find that distrust plays a significant role in the perception of risk. In the first specification, using the factor scores, we find that greater distrust in government and news media decreases the belief that hazardous waste facilities are safe, while greater level distrust.

in authorities increases the perception that facilities are safe. In the second specification, we find that distrust of all three main actors influences the level of perceived risk. Distrust in waste disposal businesses and distrust in the department of environmental resources (DER) increases the level of perceived health risk. Individuals who distrust these two actors, both who play the primary role in the siting process in Pennsylvania, do not take the information given from these sources as credible. Distrust in environmental group spokespersons, however, lowers the level of perceived risk. The results in both specifications indicate that social distrust of government and business leads to increased perception that hazardous waste facilities are harmful to one's health.

In addition, we find that the level of offer presented in the CV scenario significantly influences the level of perceived risk in a convex fashion. In both specifications the coefficient on **offer** is negative while **offer** squared is positive and significant. The convex function reaches a minimum at approximately $1100. Thus indicating that respondents who were assigned low values of compensation ($100 and $500) and high values of compensation ($ 1500 and $2000) had a higher perceived risk of a hazardous waste landfill than respondents with middle ranges ($1000). The coefficient on offer squared supports Freudenburg and Pastor (1992) conjecture that social distrust leads individuals to be suspicions in their decision making believing that money should be spent on risk reduction and not on compensation. It also supports Frey and Oberholzer-Gee's (1996) notion that offer may signal information about the level of risk.

In addition **offer** may signal respondent's on the credibility of the actors with low offers of compensation signaling that actors that are not credible and serious and very high offers signaling that the risk is higher than initially thought. In both cases, our analysis suggests that the level of compensation provides information to respondents that they use to update their risk assessment.

6. CONTINGENT VALUATION EMPIRICAL RESULTS

To analyze the role of risk assessment, social distrust and compensation we perform a CV analysis where measures of trust and prior information are included in a logit analysis of yes/no votes. In Table 6, we report the results of two specifications. The first includes the trust measures of the main actors: the; DER, environmental groups, and waste disposal business. The second specification includes the factor scores that summarize the trust measures into three information sources: Authorities, News and Government.

In both specifications the probability of a yes vote increases with the amount of the offer and decreases with increases in income. The positive coefficient on offer suggests that compensation does play a role in the acceptance of a facility in one's neighborhood. We find that a $1000 increase in offer raises the probability of saying yes by about 16%. The negative coefficient on income is consistent with diminishing marginal utility of income and also indicates that neighborhood quality is a normal good where a $10,000 increase in income lowers the likelihood of saying yes by five percent.

Table 6. Determinants of Acceptance: Logit Results

	Yes Coefficient (t-ratio)	Change in Probability of Acceptance	Yes Coefficient (t-ratio)	Change in Probability of Acceptance
Constant	5.97**		4.36**	
	(4.69)		(4.02)	
Offer	.00067**	0.016	.00061**	0.015
	(3.18)		(2.92)	
Income	−.021**	−0.59	−.019**	−0.50
	(2.37)		(2.14)	
Age	−.031**	−0.76	−.031**	−0.76
	(2.70)		(2.73)	
Children	−.089	−2.03	−.092	−1.31
	(0.51)		(0.52)	
Perceived	−.659**	−16.30	−.689**	−17.02
Risk	(4.84)		(5.13)	
Informed	−.082	−2.02	−.105	−2.59
(0.72)		(0.92)		
Government	—		−.349**	−8.62
Distrust			(2.42)	
News Media	—		−.106	−2.61
Distrust			(0.71)	
Authorities	—		.448**	11.07
Distrust			(2.83)	
Waste Disposal	−.461**	−11.40	—	
Business Distrust	(2.91)			
DER Distrust	−.225*	−5.56	—	
	(1.72)			
Environmental Group	.302**	7.46	—	
Spokesperson Distrust	(2.01)			

Sample Size 296: *significance at .10 level, **significance at .05 level,
Probability of acceptance evaluated at the means of the variables

In addition the probability of a yes vote also decreases with age where an 10 year increase in age lowers the likelihood of voting yes by 7.7%. This result is consistent with older respondents being more concerned with health status. The number of children in a household, however, does not have a statistically significant influence the likelihood of a yes vote.

We also find that in both specifications the level of prior information has no significant effect on a yes vote. We also-find that the more respondents view waste disposal facilities as likely to exhibit problems, the less likely a yes response. We find that a one unit increase on our Likert scale lowers the likelihood of acceptance by about 16.5 percent. This is consistent with a risk benefit analysis where increased perceptions of risk lower the likelihood of acceptance.

We also find that trust of information sources plays key role in the acceptance of the offer. In the first specification, which focuses on the main actors, we find that with more distrust of a waste disposal business the less likely a yes response. Here we find that a one unit increase in distrust lowers the likelihood of acceptance by eleven percent. Conversely, the greater the distrust of environmental groups the more likely a yes vote: a one unit increase in distrust increases the likelihood of acceptance by 7.6%. Distrust in the DER has significant effect on the referendum with a one unit increase in distrust leading to a five percent decrease in the likelihood of voting yes.

In the second specification, that includes the summarized factor scores, increases in distrust of **Government** decreases the likelihood of a yes vote by 8.6%. While increases in distrust of **Authorities** (environmental groups and college research reports) increases the likelihood of voting yes by eleven percent. Distrust of the News, however, has no significant effect on the referendum. These results suggest that social distrust not only influences the perceived level of risk but also directly influences the likelihood of acceptance of a LULU. As individuals distrust in business and government increases, the more compensation necessary to site a hazardous waste facility. This result is consistent with Freudenberg and Pastor (1992) who suggest individuals are prudent in the decision making process.

7. CONCLUSION

Social distrust is a phenomenon that economists must take into account when analyzing the NIMBY impasse. In our analysis, we find that individuals, in particular both younger and lower income, are distrustful of waste disposal business and the government. Our results follow the same pattern found by Frewer et al. (1996) where sources that are perceived to have a vested interest are the most distrusted.

We also find that, individuals who are distrustful of government, news media, and business exhibit higher levels of perceived risk of a hazardous waste disposal facility suggesting that individuals, who are distrustful, may not accept risk information from these sources as credible and may amplify their risk assessment. Respondents may use the level of the offer of compensation as a signal on the credibility of actors or on the level of risk of a facility. In particular, very low levels of compensation may signal that respondents that the actors are not credible which increases their perception of risk while very high levels of compensation may signal that the waste facility is of higher risk than initially perceived. This in part supports the Frey, Oberholzer-Gee (1996) conclusion that high levels of compensation may signal the implied risk of a facility; however, our analysis shows that low levels of compensation also may signal the lack of credibility of the actors.

Our analysis further suggests that distruist-of-information-sources measure may serve as a proxy for a deeper, abiding distrust of waste disposal facilities and of government. In a siting decision individuals are asked to enter into a long term relation with a firm as well as a government monitor. They are asked to accept the facility in their neighborhood today, but the firm operates over a very long period. Given this situation, a firm's reputation matters and our measure of distrust may signal that respondents perceive that government and business are likely to renege on agreements about the quantity of waste the facility will hold, length of duration, or level of safety.

The introduction of social distrust as a contributing factor in the siting debate supports the Kunrether and Easteriing (1996) conclusion that compensation plays less of a role in the siting of high risk facilities. We suggest that social distrust of the primary actors in a siting drama leads individuals to be suspicious in their decision making process. We do, however, want to stress that our analysis finds that compensation does positively influence the likelihood of accepting a facility in our CV analysis. Thus compensation leads to a conundrum: it is necessary for community acceptance but it may also be used by respondents as a signal about both the level of risk and credibility of the actors.

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1. APPENDIX

A. Information sheet provided respondents

Some Information on Hazardous Waste

The United States Environmental Protection Agency (EPA) and the State of Pennsylvania Department of Resources (DER) define hazardous waste as substances that are in the following four categories.

Ignitable—highly flammable
Corrosive—capable of corroding metal
Reactive—explosive or capable of creating toxic fumes
Toxic—harmful or fatal if swallowed

In Pennsylvania, there are more than 2000 listed ha2ardous wastes. Manufacturing industries produce most of this waste. Examples include pickle liquor from the steel industry, waste from refining petroleum, and wood preservatives. The state of Pennsylvania produces nineteen million tons of hazardous waste each year. Of this waste, eight hundred thousand tons needs to be disposed of in commercial facilities. The steel industry produces half of the hazardous waste in Pennsylvania.

Hazardous waste threatens human life, human health, or the environment when improperly stored, treated or disposed. The State of Pennsylvania has strict regulations on the operation of hazardous waste landfills. The State closely checks hazardous waste landfills with quarterly inspections, ground water inspections, and unannounced inspections. These inspections make sure all regulations are followed. If hazardous waste landfills follow all regulations then they are considered safe.

B. Survey Questions

Section A. Your knowledge and opinions about hazardous waste

Al. Before you received this questionnaire, did you know about the issues of locating hazardous waste facilities in Pennsylvania?

NOT AT ALL INFORMED	1	2	3	4	5	VERY INFORMED

A3. How much would you trust the information you receive about hazardous waste from the following sources?

	TRUST ALOT				TRUST NONE
1. Local county/Township officials	1	2	3	4	5
2. Department of Environmental Resources (Pennsylvania DER)	1	2	3	4	5
3. State Governmental Representatives	1	2	3	4	5
4. Environmental Protection Agency (US Government EPA)	1	2	3	4	5
5. Waste Disposal Businesses	1	2	3	4	5
6. News Paper Reports	1	2	3	4	5
7. Television and Radio Reports	1	2	3	4	5
8. Environmental Group Spokespersons	1	2	3	4	5
9. Reports from Family and Friends	1	2	3	4	5
10. College Research Reports	1	2	3	4	5

Section B. A hypothetical hazardous waste proposal

B.I Suppose the State was considering locating a hazardous waste landfill that collects waste from Western Pennsylvania industries in one of the following counties: Clarion, Lawrence, or Mercer.

Suppose the State proposes to locate the hazardous waste landfill in your county. In return the State proposes to compensate people by reducing State income tax by $A per family in your county per year. Would you be willing to accept this proposal?

L YES
2. NO
3. DONT KNOW

If you answered YES to question 3, which BEST describes why?

1. THE TAX REDUCTION APPEALED TO ME.
2. HAZARDOUS WASTE FACILITIES ARE SAFE.
3. HAZARDOUS WASTE FACILITIES CREATE JOBS FOR THE COMMUNITY.
4. HAZARDOUS WASTE FACILITIES NEED TO GO SOMEWHERE.

If you answered NO to question 3, which BEST describes why?

1. THE TAX REDUCTION WAS NOT ENOUGH
2. THE STATE DOES NOT HAVE THE RIGHT TO LOCATE HAZARDOUS WASTE FACILITIES
3. THERE WAS NOT ENOUGH INFORMATION ON THE HAZARDS OF THE FACILITY
4. HAZARDOUS WASTE FACILITIES SHOULD GO SOME PLACE ELSE

If you answered DONT KNOW to question 3, which best describes why?

1. I NEED MORE INFORMATION
2. I DIDNT UNDERSTAND THE QUESTION

3. I AM NOT SURE HOW THE TAX CUT OR THE HAZARDOUS WASTE FACILITY AFFECTS MY HOUSEHOLD
4. I DISAGREE WITH THE QUESTION

Section C. Your knowledge and opinion about risk

We read about facilities that have some environmental risks due to spills, residues or other accidents. How likely do you feel a "problem" would arise at some future time (20-30 years from each of the following facilities.

	NOT AT ALL LIKELY				VERY LIKELY
C1. Hazardous Waste Landfill	1	2	3	4	5

NOTES

1. These results suggest two interpretations. The first interpretation: individuals of different demographic group have attributes that influence their level of trust, i.e.. Older individuals come from an era when businesses were view with less skepticism. The second interpretation: individuals have more trust of information sources that agree with their own assessment, i.e. an individual perceives low risk and distrusts sources of information that disagrees with their assessment. Our analysis does not imply causation. Our analysis only identifies individuals who exhibit different levels of distrust.

2. A respondents income level may proxy for the notion that low income neighborhoods are at tbe greatest risk of having a facility sited and low come individuals have the least access to averting behavior in a siting dilemma.

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